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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Maximum allowable values of energy consumption and energy
efficiency grade for household refrigerating appliance**

家用电冰箱耗电量限定值及能效等级

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1 Scope

China's mandatory national standard setting the minimum energy efficiency and the grades for household refrigerating appliances. A refrigerator is the appliance that matters most in a national energy account, because it is the one that never switches off: a single unit's consumption is modest, and multiplied by hundreds of millions of households running continuously for fifteen years it becomes power stations. That is why the minimum allowable value here is a floor with real force - a model below it may not be sold at all - and why the grades above it drive the market, since the coloured label is what a buyer compares in the shop. The measurement basis is the annual consumption normalised to the storage volume and the compartment temperatures, so a large appliance is not penalised for its size and a freezer is not compared against a chiller. The standard specifies the limits, the grades and the test method.

This document specifies the maximum allowable values of energy consumption, energy efficiency grades and implementation requirements for household refrigerating appliances and describes the corresponding test methods. This document applies to motor-driven compression-type household refrigerating appliances, and semiconductor refrigerating appliances with a volume less than or equal to 60 L (hereinafter referred to as the "refrigerating appliances"). This document does not apply to refrigerating appliances specially designed for commercial or vehicle-mounted use.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to

this document.

GB/T 8059 Household and Similar Refrigerating Appliances QB/T 5369 Semiconductor Refrigeration Appliance

IEC 62552-3.2020 Household Refrigerating Appliances - Characteristics and Test Methods - Part

3 Terms and Definitions

The terms and definitions defined in GB/T 8059 and QB/T 5369, and the following are applicable to this document.

3.1 built-in refrigerating appliance A fixed refrigerating appliance intended for installation in a cabinet, niche reserved in the wall, or similar location. NOTE. fixed refers to an appliance that is fastened to a bracket or fixed in a specific location for

4 Classification of Refrigerating Appliances

4.1 By the refrigeration principle, the refrigerating appliances are classified into motor-driven compression-type refrigerating appliances and semiconductor refrigerating appliances.

4.2 By their energy efficiency characteristics, the refrigerating appliances can be classified into 10 types, as shown in Table 1.

5 Maximum Allowable Value of Energy Consumption

5.1 Calculation of Adjusted Volume of Refrigerating Appliances The adjusted volume of refrigerating appliances is calculated in accordance with Formula (1). Where, V_{adj}

---the adjusted volume, expressed in (L); n

---the number of different types of compartments of a refrigerating appliance; V_c

---the measured volume of a specific type of compartment, rounded to one decimal place and expressed in (L); F_c

---a constant. For frost-free refrigerating appliances, this constant is

1.5 for compartments using forced convection and

1.0 for other types of compartments. For direct-cooling refrigerating appliances with a volume 300 L and a direct-cooling refrigerator-freezer or direct-cooling freezer (including types 5, 6, 8 and 9 specified in Table 1), this constant is 1.2; for other types, this constant is 1.0; NOTE. the frost-free refrigerating appliances refer to appliances in which all compartments are equipped with automatic defrosting and automatic defrost water removal, and at least one compartment is cooled using a frost-free system. W_c

---the weighting coefficient for each compartment type, see Table

2. The value for the ice- making compartment can be determined based on the characteristic temperature indicated; the value for the variable temperature compartment is determined based on the characteristic temperature corresponding to the compartment type selected during the energy consumption test; CC

---the climate type correction coefficient, which equals to 1 for SN or N climate type,

1.1 for ST climate type, and

1.2 for T climate type. For refrigerating appliances with multiple climate types, the climate type with the highest climate type correction coefficient is used to calculate the adjusted volume; BI

1.2 for built-in refrigerating appliances and

1.0 for the others.

6 Energy Efficiency Grade Determination Method

6.1 Calculation of Standard Energy Efficiency Index The standard energy efficiency index of the refrigerating appliances is calculated in accordance with Formula (4). Where, s

---the standard energy efficiency index; Es

---the standard energy consumption, expressed in (kW h/24 h); Ebase

---the baseline energy consumption, expressed in (kW h/24 h).

6.2 Calculation of Total Energy Efficiency Index The total energy efficiency index of the refrigerating appliances is calculated in accordance with Formula (5). Where, t

---the total energy efficiency index; Et

---the total value of energy consumption, expressed in (kW h/24 h); Ebase

---the baseline energy consumption, expressed in (kW h/24 h).

6.3 Determination of Energy Efficiency Grade The energy efficiency of refrigerating appliances is divided into five grades, with Grade 1 representing the highest energy efficiency. In accordance with Table 5, determine the energy efficiency grade of the product. This energy efficiency grade shall not be lower than the rated energy efficiency grade of the product.

7 Test Methods

7.1 Volume Test With the exception of the following, the volume test shall be conducted in accordance with Appendix H of IEC 62552-3:2020.

- a) When a compartment contains a sub-compartment, if the sub-compartment is a solid foam insulation structure, then, the sub-compartment is calculated based on the volume within the solid insulation structure, and the volume of the compartment within which it is located is calculated by subtracting the volume occupied by the solid structure on the periphery the sub-compartment.
- b) Any partitions with an average thickness greater than 5 mm between compartments, compartment and sub-compartment, or sub-compartments shall be excluded from the volume calculation, which is consistent with the calculation method for solid foam insulation structures.
- c) For a cross-shaped double-leaf door structure, where a hollow partition is used to separate the space, with the left and right sides forming a temperature zone, the entire partition can be considered out of place. For a cross-shaped double-leaf door with a solid partition in the middle, it is considered in place, and the middle partition is not counted in the volume. NOTE. the hollow area must not be less than 20% of the partition area.
- d) For drawer-type compartments or sub-compartments, when measuring the volume, the drawers and their rails are considered out of place. The depth is measured from the rear inner wall to the location of the drawer front door lining. For sub- compartments, the depth is measured from the rear inner wall to the edge of the shelf or the outer edge of the drawer (whichever is greater).

7.2 Energy Consumption Test With the exception of the following, the energy consumption test shall be calculated in accordance with the provisions of IEC 62552-3.

- a) During the energy consumption test, motor-driven compression-type refrigerating appliances are tested at the ambient temperature specified in IEC 62552-3, while semiconductor refrigerating appliances are tested at an ambient temperature of 25 °C.
- b) During the energy consumption test, the variable temperature compartment is tested in accordance with the selected compartment type corresponding to the characteristic temperature in the middle or upwards from the middle (only when the middle temperature value is not the characteristic temperature point specified in the Standard, select the nearest one upwards from the middle) of the temperature range specified by the manufacturer. For example, if the variable temperature compartment has a temperature range of 14 °C ~ 10 °C and the variable temperature compartment is specified as meeting the requirements of "two-star" compartment, "one-star" compartment, "zero-star" compartment, chill compartment and fresh-food compartment, first, the middle value of the temperature range is 2 °C, and the nearest characteristic temperature upwards from the middle is 0 °C, hence, the test is conducted in accordance with the "zero-star" compartment. If the variable temperature compartment has a temperature range of 7 °C ~ 10°C and a middle temperature of 1.5 °C, the nearest characteristic temperature upwards from the middle is 2 °C, hence, the test is conducted in accordance with the chill